

WHAT IS CLAIMED IS:

1. A method for producing a high strength cast aluminum alloy body comprising:

providing a molten aluminum alloy;

centrifugally casting the molten aluminum alloy in a mold to form a cast body; and

hot isostatically processing the cast body to form a hipped body.

2. The method of 1, further comprising solution heat treating the hipped body to form a heat treated body.

3. The method of claim 2, wherein the solution heat treating step comprises heating the hipped body to at least about 850°F.

4. The method of claim 3, wherein the solution heat treating step comprises heating the hipped body for at least about 2 hours.

5. The method of claim 4, wherein the aluminum alloy is a 6061 aluminum alloy and the solution heat treating step comprises heating the hipped body to about 900 to 950°F for about 4 to 10 hours.

6. The method of claim 2, further comprising heat aging the heat treated body to form an aged body.

7. The method of claim 6, wherein the heat aging step comprises heating the heat treated body at about 300 to 400°F.

8. The method of claim 6, wherein the heat aging step comprises heating the heat treated body for about 2 to 20 hours.

9. The method of claim 7, wherein the aluminum alloy is a 6061 aluminum alloy and the heat aging step comprises heating the heat treated body at about 325 to 375°F for about 7 to 10 hours.

10. The method of claim 6, further comprising machining the aged body to remove an impurity region.

11. The method of claim 1, wherein the centrifugally casting step comprises rotating a mold at a speed of at least about 500 rpm.

12. The method of claim 1, wherein the centrifugally casting step comprises centrifugally casting the molten aluminum alloy at a centrifugal acceleration of at least about 30 G.

13. The method of 2, further comprising machining the heat treated body to remove an impurity region.

14. The method of claim 1, wherein the hot isostatically processing step comprises heating the cast body at a temperature of at least about 900°F while applying an isostatic pressure of at least about 10 KSI.

15. The method of claim 14, wherein the hot isostatically processing step comprises heating the cast body to a temperature of about 935 to 985°F for at least one hour while applying an isostatic pressure of at least about 14 KSI.

16. The method of claim 1, wherein the step of providing a molten aluminum alloy comprises forming melted aluminum alloy in an induction furnace.

17. A high strength cast aluminum alloy product produced by a process comprising the steps of:

providing a molten body of a melted aluminum alloy;
centrifugally casting the molten body to form a cast body; and
hot isostatically processing the cast body to form a hipped body.

18. An article formed from an aluminum alloy having a generally round grain structure and being substantially free of microshrinkage defects.

19. The article of claim 18, wherein the aluminum alloy has an average grain size is about 3000 to 4000 μ inch.

17
0.7

20. The article of claim 18, wherein the aluminum alloy is a wrought aluminum alloy having sufficient fluidity as a melt for centrifugal casting.

21. The article of claim 20, wherein the wrought aluminum alloy is selected from the group consisting of series 2000, 4000, 6000, 7000 and 8000 series aluminum alloys.

22. The article of claim 20, wherein the wrought alloy is a 2024, 2090, 2095, 2195 or 2219 aluminum alloy.

23. The article of claim 20, wherein the wrought alloy is a 6061 aluminum alloy.

24. The article of claim 23, wherein the wrought alloy is a 6061-T6 aluminum alloy.

25. The article of claim 20, wherein the wrought alloy is a 7075 aluminum alloy.

26. The article of claim 20, wherein the wrought alloy is a 8090 aluminum alloy.

27. The article of claim 18, wherein the aluminum alloy is an Al-Mg-Si type aluminum alloy.

28. The article of claim 26, wherein the aluminum alloy comprises 0.4-0.8% Si, 0.15-0.4% Cu, 0.04-0.35% Cr, 0.8-1.2% Mg, 0.05-0.7% Fe and at least 94.85 wt% Al.

29. The article of claim 18, wherein the aluminum alloy is an Al-Cu type aluminum alloy.

30. The article of claim 18, wherein the aluminum alloy is an Al-Zn type aluminum alloy.

31. The article of claim 18, wherein aluminum alloy has an elongation of at least about 4%.

32. The article of claim 18, wherein the aluminum alloy article has a tensile strength, a yield strength and an elongation meeting ASTM wrought specifications.

33. A cast aluminum alloy article formed from a 6000 series aluminum alloy and having an elongation of at least about 4% and a tensile strength of at least about 38 KSI.

34. The article of claim 33 having a 0.2 % offset yield strength of at least about 32 KSI.

35. The article of claim 34 having a tensile strength of at least about 50 KSI.

36. The article of claim 34 having an elongation of at least 8%.

37. The article of claim 34 having a 0.2 % offset yield strength of at least about 45 KSI.

38. The article of claim 33 having an elongation of at least 6%, a tensile of at least about 45 KSI and a 0.2 % offset yield strength of at least about 40 KSI.

39. The article of claim 33 having a Brinell Hardness at 500 kg load of at least about 80.

add
B4
C2